DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
MICROSYSTEMS TECHNOLOGY OFFICE (MTO)
PLANNED PROCUREMENTS
January 2000

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Micro Power Generation (MPG): Ultra-miniaturized sensors, actuator, communications, and control systems have successfully been achieved using a broad range of existing and innovative micro-fabrication techniques. These enabling technologies leverage heavily on the well-established and sophisticated microelectronics fabrication techniques to create micro-mechanical structures, and are hence collectively called microelectromechanical systems (MEMS) technology. MEMS enables batch-fabrication of chip-level integrated sensors, actuators, and electronics. As a result, MEMS provides the advantages of small size, low-power, low-mass, low-cost and high-functionality to integrated electromechanical systems both on the micro as well as on the macro scales. Integrated MPG will create truly stand-alone, remotely distributed micro-sensors and micro-actuators. The energy densities of liquid or solid fuels are at least two orders of magnitude higher than the best available batteries. Taking advantages of this fact, a micro-fabricated power generator that converts the chemical energy stored in solid or liquid fuels into electrical power will eliminate the reliance on batteries while providing ultra miniaturization. MPG will provide the sub-watt-level power sufficient to sustain operation for a great majority of remotely distributed sensors and actuators with integrated electronics, while maintaining an extremely small size. The ultimate goal of this program is to demonstrate the technology to integrate MPG with sensors, actuators and electronics on the same micro-platform.	$20M	BAA 2QFY00 Total program: 3 years	Dr. William C. Tang MTO

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Bio-Fluidic Chips (BioFlips): BioFlips provide the technology foundation for ubiquitous deployment of miniaturized biodetectors for various military applications. Potential payoffs include unobtrusive monitoring of the warfighter's physiological conditions for real-time detection of exposure to chem/bio warfare agents, identification of infectious diseases, monitoring battlefield vital signs and the provision of indicators to assist in triage and decontamination efforts. These chip technologies are also the enablers for wide-area distributed biosensors. This technology will allow these functions to be performed in a package that is extremely compact and unobtrusive, perhaps able to fit on a wristwatch. BioFlips technology can be extended to improve national healthcare by the unobtrusive and continuous monitoring of high-risk patients. A key goal of the BioFlips program is to develop integrated microfluidic component technologies that enable on-chip feedback control for reconfigurable assays.	$30M	BAA 00-11 Proposals due: 1/25/00 Total program: 3 years	Dr. Abraham P. Lee MTO
Acoustic Microsensors: Compact acoustic systems are critical to a wide range of military applications, from distributed sensors in the battlefield, to highly directional, soldier-mounted sensors, capable of operating in urban environments. The goal of this program is to demonstrate a low-cost-to-manufacture, smart, miniature, passive, acoustic sensor capable of locating, tracking, and identifying a voice or a sound source in a noisy environment. In order to demonstrate an acoustic microsensor system, one must emphasize the areas of sound transduction, noise control, and sensor enclosure. Recent advances in micromachining and microelectromechanical devices (MEMS) will enable low-cost, broad-band (2×10^{-1} to 2×10^{5} Hz) acoustic transducers compatible with conventional silicon semiconductor fabrication processes, commonly used for the demonstration of coupling structures, and integrated readout electronics. These acoustic transducers with the proper signal processing will be used for the demonstration of acoustic microsensors surpassing the performance of the most sensitive biological auditory system (i.e., highly directional, operates under very noisy conditions, has a broad bandwidth, consumes very low power, and can be embedded in small platforms, preferably less than one inch in any direction).	$10M	BAA 00-08 Proposals due: 1/18/00 Total program: 3 years	Dr. Edgar J. Martinez MTO